UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Certified Mail 7013 1090 0000 1618 0485
Return Receipt Requested

November 21, 2014

Helen Ordway
Alon Bakersfield Refinery
6451 Rosedale Highway
P.O. Box 1551
Bakersfield, CA 93308

Re: Notice of Deficiency (NOD), Alon Bakersfield Refinery
Underground Injection Control (UIC) Permit Application
Class I Injection Wells, R9UIC-CA1-FY11-2

The United States Environmental Protection Agency, Region IX (EPA) is in receipt of Alon Bakersfield Refinery's (Alon's) May 23, 2014 response to EPA's March 27, 2014 Request for Information (RFI). Upon further review of Alon's January 2011 application, and in view of the responses to EPA's RFI, we are issuing this Notice of Deficiency (NOD). To address this NOD, Alon needs to submit a revised Class I UIC permit application, and the revised application must address the following technical deficiencies that we have identified in Alon's January 2011 application and May 2014 RFI response.

Information on the existing injection wells and Area of Review (AOR) maps:

It is not possible to discern from the information and maps provided where the existing injection wells are located, and into which formation(s) they are injecting fluids. This information forms the basis of a UIC permit, and it is not clearly provided in the current application. The maps depicting the well locations provided in Attachment A of the application, which were also provided in Alon's letter dated May 23, 2014 are not acceptable because the existing injection well locations are not discernable. The well locations relative to the section grids must be provided in the revised application. In order to thoroughly address this comment, Alon should provide a map similar to the scale and size of the Area of Review (AOR) map in Plate 10 of the January 2011 application, with the existing well numbers and locations clearly identified, and with the AOR for each well depicted on the maps.

In addition, the legend for existing well types and status should be added to the AOR map, and to the other maps provided in the application.

Alon must also provide detailed information on the depth and thickness of the injection formations, as well as the confining units.

Status of Well Red Ribbon 7:

Alon's May 23, 2014 letter reported the status of this well as "non-operational with the intent to evaluate its potential value". The well's status as reported in the January 2011 application was described as "scheduled to be permanently plugged and abandoned." The revised application must include a detailed plan and schedule for the evaluation of the well's potential value, and/or a plugging and abandonment plan for this well.

Information on the proposed injection wells and their type:

EPA noted in its RFI letter that the information provided in the January 2011 application was vague with respect to the proposed injection wells – locations, depth, construction details, etc. Alon's reply did not provide any additional information regarding the proposed injection wells; thus the revised application should provide this detail. Refer to EPA Form 7520-6 for the required information.

Aquifer exemption supporting information:

The documentation provided to EPA to verify that the basal Etchegoin (Fairhaven), Chanac, and Santa Margarita formations are exempt aquifers at the existing and proposed injection well locations is incomplete. EPA granted aquifer exemptions for several formations in the Fruitvale Oil Field as part of our approval of the State of California's Class II UIC Program. Exemptions for the purpose of injecting Class II fluids were approved for the hydrocarbon producing portions of these three formations in 1983. However, EPA considers Alon's existing and proposed injection wells as Class I Non-Hazardous. Thus, as part of the revised application, Alon must submit information to demonstrate that current injection is occurring below the lowermost underground source of drinking water (USDW). If not, Alon may need to apply for an aquifer exemption from EPA, or the wells may need to be re-completed into an appropriate formation. This requirement also pertains to the proposed injection wells.

AOR calculations:

In the January 2011 application, the AOR calculation for each of the wells was based on volumetric waste front calculations rather than pressure buildup calculations. The latter approach would greatly increase the AOR, unless the receiving zones are significantly underpressured relative to normal hydrostatic pressures, and/or the USDW pressure. Such zonal under-pressurization may be the case, at least in the hydrocarbon producing zones, but this discussion is not provided in the 2011 application. Current formation pressures must be included and used to present an updated AOR determination in the revised application. Waste front calculations should also be updated to include volumes injected since 2010, as well as any changes in the number, location or differing injection rates in each existing well, and in each proposed injection well.

The predicted waste front for the three operating wells is not shown, and the depiction of the predicted waste front for the proposed wells is not shown in detail in the figures presented in Appendix A of the application. Please modify the calculations and depiction of the waste front

distribution in Plates1, 1a, 1b, and 2 to account for the cumulative interference effects of injection into the existing wells, and the proposed injection wells.

In addition, any effect that existing Class II injection wells and oil production wells may have on the waste front pressure wave distribution should be considered in the AOR evaluation for the existing and proposed Class I injection wells.

Also, the map scales presented for Plates 1, 1a, 1b, and 2 (1 inch = 1,000 feet) do not correspond to the actual map scales used on those figures. Thus, the radial distances of the waste front and pressure wave front depicted are inaccurate. Please correct the maps and/or map scales accordingly when the maps are modified as requested above.

The calculations of the waste front radius and pressure wave effects in Appendix A require clarification in the context of the discussion of the AOR determination on page 2 and 3 of the application. Specifically, please discuss and clarify the basis for the values of Q, H, and K applied, and clarify whether the calculations apply to the existing wells, and/or the proposed wells, or both, and to which Area they apply.

Corrective Action:

The actual number and location of existing wells within the AOR will not be known until the zone of endangering influence (ZEI) is determined from updated waste front and pressure build-up calculations as noted above. This information must be included in the revised application in order for EPA to determine whether corrective action is necessary. Wells located within the 2011 proposed AOR are listed in Table 1 of the application, but detailed well location, construction, abandonment, and well status information should also be provided in a similar table for wells located within the AOR that will be updated with the revised application.

Plugging and Abandonment (P&A) Plans:

The P&A Plans provided with the revised application should include a cement plug at the base of the USDW. The plans submitted with the January 2011 application do not include labels so it is not possible to determine if a plug is proposed at this depth. The Plugging and Abandonment Plan details described on page 30 in Attachment Q differ in some respects from the Proposed Abandonment Program and schematics provided in Appendix M, and with the EPA Form 7520-14 schematic. For example, the Narrative Description of Cement Placement on page 30 states that the bottom cement plug will be placed to 100 feet above the top of highest perforations, but the Proposed Abandonment Program for the WD-1 well calls for a cement plug from 5,530 to 2,900 feet, while the schematic shows that plug at 2,900 to 5,565 feet. These inconsistencies should be reconciled, and Alon must ensure that cement plugs are placed, at a minimum, from 100 feet below to 100 feet above the base of the USDW in each well. The base of the USDW should be clearly identified and labeled in the schematics.

Step Rate Test (SRT) Red Ribbon WD-1;

The SRT report included with the January 2011 application states that the well was completed in the Chanac Formation, not the Lower Santa Margarita Formation as stated in the application. The

SRT information should be reconciled between these two documents. Also, the revised application should provide information and data on the fracture gradient attributable to the Lower Santa Margarita Formation. In addition, note that EPA will determine the maximum allowable surface injection pressure based on a safety factor of 80 percent of the bottom hole fracture pressure gradient, not 80 percent of the surface fracture pressure plus friction loss, as described on page 9 of the application, unless a different calculation is demonstrated to be appropriate and is acceptable to EPA. The revised application should incorporate this correction.

Please provide a written response to this letter within 30 days of its receipt. Your response must include a schedule for submittal of a revised application. If you have any questions, please contact me at (415) 972-3971 or call Michele Dermer of my staff at (415) 972-3417.

Sincerely,

David Albright, Manager
Drinking Water Protection Section

cc: Warren Gross, RWQCB
Dan Wermiel, DOGGR, District 4